

PEO Aviation Commercialization

Delivering the Best Possible Product to the Warfighter in the Most Affordable Manner

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The Army Program Executive Office for Aviation (PEO Avn) has six project and product manager's offices:

- Comanche
- Longbow Apache
- Utility (Black Hawk)
- Kiowa Warrior
- Aviation Electronic Combat
- Aircrew Integrated Systems

The Aviation Electronic Combat and Aircrew Integrated Systems offices address systems that apply across multiple platforms, while the four aircraft offices have the responsibility to manage a particular helicopter.

The project manager's offices (PMO) as well as the PEO are charged with delivering the best possible product to the soldier in the most affordable manner. Throughout the PEO we have incorporated improved management techniques such as the widespread use of integrated product teams. We are actively assisting our support command (ATCOM) with the revision of government-unique standards as well as less reliance on "boiler plate" government requirements. We have ongoing participation in other DoD initiatives such as the Joint Aeronautical Commander's Group and the USAF

Manufacturing Technologies program. In our benchmarking efforts, we keep apprised of the progress of consortium efforts like the Agility Forum as well as corporate streamlining successes. This article, however, focuses on the planning and implementation of commercialization.

What is "Commercialization"?

One of the initial tasks in undertaking a commercialization initiative is defining what the effort includes, and more importantly, what it excludes. There are several important DoD initiatives underway. A short list includes acquisition reform, block changes, Defense Contract Management Command (DCMC) reinvention laboratories, Military Specifications and Standards reform, privatization efforts, single process plants, and streamlining. If the objectives of commercialization are improved cost, schedule, and performance, then it parallels standard project management goals. Without setting some bounds on the effort, "commercialization" becomes synonymous with "improvement." When this happens, the effort becomes so diffused as to preclude progress on any particular front. Frequently there is a temptation to resort to rhetoric; that is, referring to vision and strategic objectives without moving toward the difficult implementation stages.

We view commercialization as "the process of benchmarking the best practices of similar commercial processes with the objective being improved cost efficiency and effectiveness of DoD operations." Note what is excluded from this definition. It does

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► UH-60 BLACKHAWK
MEDEVAC



▲ NEARING ITS TWENTIETH PRODUCTION YEAR, THE BLACK HAWK REMAINS THE WORLD STANDARD FOR A MILITARY UTILITY HELICOPTER.

not include combat operations, requirements determination, nor, for the most part, the improvement of solely internal government practices and procedures. We have made every effort to stay abreast of corporate reengineering, activity-based costing, the application of information technology, and business process innovation experiences of the past six years.

There are many excellent examples of successes and failures. Within the Department of Defense, however, we have some distinct considerations:

- The user's bottom line is performance, not financial.
- The enterprise operates with public funds, which are held to different standards than corporate ones.

- Often there are legal restrictions to committing to long-term project plans, investments, or contractor relationships.
- Weapons system performance is difficult to judge and will not be fully demonstrated until combat operations take place.
- There are restrictions on hiring authority, personnel skills, retraining, transfer, and remuneration.
- Funding is provided in categories that limit flexibility.
- The government cost accounting system generally does not collect data in sufficient detail.
- There are legal limits to outsourcing (e.g., contracting, depot maintenance).
- There are a large number of affected organizations, most of whom have a voice in proposed changes.
- Resource constraints are seldom mirrored by reductions in requirements.

This list should not be construed as reasons to avoid commercialization but rather a reminder on why our challenges are sometimes greater than our corporate counterparts.

The direct labor and manufacturing portion at both the prime contractor and vendors is being addressed by programs such as the MIT Lean Aircraft Initiative, the USAF Manufacturing Technology Industrial Base Pilots, and the DoD Non-Government Standards Integrated Product Team. The DCMC reinvention labs are focusing on the management and administrative aspects. The focus of commercialization depends on the life cycle phase of the program. One can orient on: 1) manufacturing technology; or 2) business practices.

These are not mutually exclusive. In practice, however, a program office that is defining its product will find the highest payoff in the material and manufacturing processes while, in an established program (production or modification), the primary opportunities are in the areas of management and administration. For example:



▼ THE COMANCHE IS THE ARMY'S NEXT-GENERATION, RECONNAISSANCE-ATTACK HELICOPTER.

◀ THE AH-64D LONGBOW APACHE IS THE PREMIER ATTACK HELICOPTER IN THE WORLD.

- commercial spares availability;
- substantial improvement to the Engineering Change Proposal (ECP) process; and
- dramatic improvements to the contracting process and requirements, e.g., Contract Data Requirements Lists (CDRL), cost and pricing data, testing, reports, coordination, approvals, and compliance verifications.

During the first three phases of the Life Cycle Management Model, the predominant costs are in the design requirements. Consequently, there is a significant opportunity to increase value by placing greater reliance on commercial standards and components. This strategy has several advantages, including lower research and development (R&D) costs, quicker and less expensive access to technology improvements, and lower manufacturing costs. Of course, this is also when the long-term logistics and support concepts are determined. So, although the material and manufacturing process receives the most attention, there is also great opportunity to affect the eventual operational support and business costs.¹

Implementation

Comanche. The Comanche is the Army's next-generation, reconnaissance-attack helicopter. The prime manufacturers are Sikorsky and Boeing. This is the first Army aircraft designed using product development teams and engineering design simulation. Throughout the development process, simulation has been used to design parts, assure fit and clearances, ensure outstanding handling characteristics, and to verify tactics prior to actual manufacturing. The first prototype flew on January 4th of this year.

The charter of this commercialization process action team is to: "Reduce Comanche production and operations and support costs through application of commercial practices and parts." We are in the final stages of focusing on commercial parts and are now expanding to business practices.

Early in the development phase, the Comanche program recognized many of the military suppliers could not economically produce the small number of Military-Standard electronic components required. The government-contractor team began looking for commercial electronic components that would meet the full military requirement at significantly reduced cost. Several major contractors have commercial divisions producing similar parts. With the aid of these suppliers, Comanche was able to establish a design that would meet both performance and reliability requirements using commercial components. Comanche designs now include commercial plastic encapsulated microcircuits and high industrial reliability electronic components. Additionally, the PMO is pursuing more applications including processors, controllers, and circuit boards.

With respect to commercial business and administrative practices, we have made some significant changes to shift the responsibility for performance from the government to the contractor. Examples include:

- a commercial-type, easy-to-use warranty;
- guaranteed minimum time on spare parts turnaround;
- a warranty on all parts for a specified period or flight hours; and
- limited government involvement.

Additionally, we intend to reduce oversight, management, and overhead cost by initiatives such as:

- contractor configuration management;
- complete contractor support (no government spares for at least the first five years);
- contract depot repairs for the first five years or longer;
- contractor-developed training system; and
- contractor software support.

Longbow Apache

The AH-64A Apache helicopter is manufactured by McDonnell Douglas

Helicopter Systems (MDHS). Lockheed Martin is the principal subcontractor manufacturing the targeting and pilotage systems. It is the premier attack helicopter in the world, and we intend to maintain that distinction. The upgrade to the AH-64D Longbow Apache is a modification program. Apaches are inducted into a "de-mod" line, stripped down to the basic airframe, then modified by MDHS to incorporate an integrated avionics suite using multifunction displays. Also, MDHS adds a Loral radar frequency interferometer, radar frequency fire-and-forget Hellfire missiles, and a mast-mounted millimeter wave radar air/ground targeting system manufactured by a joint venture of Northrop and Lockheed Martin. This enables the crew to identify, classify, and prioritize 128 targets and permits coordinated fire on 16 separate targets within one minute.

An example of the MDHS effort is the manner in which the government and contractor implement changes. The airframe has a useful life of 20 to 30 years. However, the systems have a much shorter life cycle. In the instance of avionics, electronics, information processing, and electronic warfare systems, we frequently encounter life cycles of 24 to 48 months. Given accelerating technology developments and the increasing use of information systems on our helicopters, we expect to process ECPs with greater frequency. The current ECP process is sequential, consumes thousands of labor hours, and requires one to three years. It is this type of business process that commercialization seeks to change.

In August of 1995, the MDHS commercialization laboratory commenced with the first meeting of the integrated product team (IPT). Four working groups were established along functional lines: Acquisition, Integrated Product Development, Production, and Product Support. Over the next few months, these working groups asked the question, "What can be done more efficiently?" As one would expect, MDHS tended to focus on the

reduction of oversight, while the government frequently looked for improved quality. An approach has been selected that allows MDHS to earn reduced oversight by demonstrating excellent performance. A fixed price incentive, multi-year contract is being negotiated that allows additional scope to be added. This added scope is intended to resolve the issue of consideration as well as provide industry with the incentive to reduce costs.² This type of contracting is considered essential to ensuring MDHS and the government remain committed to both these and further cost reductions.

Fifty-two specific proposals were identified. Once the initial proposals were defined, performance metrics were established, and teams were reporting on progress, the decision was made to tackle the “big ones” — i.e., “Phase II.” This commenced with a brainstorming session where knowledgeable government and MDHS personnel gathered to answer the question: “If there were no restrictions or previous methods, how would we do this?” The result was 67 ideas for major improvement. After discussions, this list was reduced to 12. An example is the proposal to pay a contractor a flat fee per flight hour for all spare parts. These phase II proposals are the truly difficult ones. They are typical of the kind of change the government does not do very well, i.e., low visibility; no strong advocate; the absence of empirical data; and many, sometimes vocal opponents.

Black Hawk

Nearing its twentieth production year, the Black Hawk remains the world standard for a military utility helicopter. Sikorsky has produced over 1,700 Black Hawks since 1977.³ Fiscal constraints have reduced procurement rates from 60 to 36 per year. Sikorsky offered to use commercialization initiatives to reduce costs to the point that they could sell UH-60Ls at the same price, despite a 50-percent reduction in the production rate.

The Black Hawk commercialization effort required significantly more gov-

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ernment coordination than the Longbow Apache initiative. The Navy, Air Force, Marines, and Coast Guard buy Black Hawk derivative helicopters. Additionally, the Marines and the Navy buy other military helicopters produced at the same facility. The same four working groups used on the MDHS commercialization laboratory were used on this effort. In this case, however, the management working group was comprised of the program managers from the Army, Navy, Air Force, Sikorsky, General Electric (engines), the Defense Plant Representatives Office commander, and representatives from the Aviation and Troop Command.

Sikorsky began by red-lining the current contract highlighting areas whenever they considered the cost exceeded the value. In all, Sikorsky recommended 85 specific changes that were grouped into 29 general areas. Between Oct ‘95 and Jan ‘96, the IPT completed its review and approved 25 of the 29 proposals, eliminated all 197 military standards and specifications, eliminated 39 CDRL items, and modified another 30 by reducing content, frequency, and quantity.

In contrast to studies, this effort is characterized by identifying and implementing change. There are six major areas of agreement:

- incorporating performance criteria and eliminating all military specifications in the prime item development specification;
- transferring configuration control for Class II engineering changes to the contractor;
- using milestone billing versus progress payments;
- accepting third-party oversight of an ISO 9001 quality system;
- greater reliance on price versus cost analysis; and
- risk compensation for the government due to decreased oversight.

Sikorsky incorporated all of the approved commercialization initiatives into its final proposal submitted in early April 1996.

Challenges

The decision to commence a major commercialization effort should not be taken lightly. One of the strengths of a bureaucracy is its stability. In this case, one attempts to change well-established procedures. As an example, the risk-averse culture has been reinforced by repetitive audits, award protests, and publicity. Conscientious employees learn to avoid mistakes. In many cases, altering attitudes and building support by those who will implement the changes is much more difficult than defining the problem and identifying a solution.

In most instances, it is relatively easy to state strategy. It is more difficult to identify the specific “how-to’s.” The actual implementation is time-consuming and significantly more difficult. There are many examples of this, including the effective use of warranties, relying on price quotes instead of cost and pricing data, using past performance in the selection of contractors, and the elimination of government-unique specifications and standards. These are excellent ideas that have immediate appeal. The implementation, however, turns out to be particularly difficult.

Generally, the contractors are more responsive to change than the government. There may be several agencies involved and little immediate progress to reinforce the required long-term commitment. A ground swell movement can get this started. A contractor-led effort can identify areas to focus attention. But this is not an area where good ideas will carry the momentum. Success will require strong and forceful leadership.

Lessons Learned

Every program is unique, but there are some lessons that can be broadly applied. The list below is our top 25. They come from our experiences as well as those from other DoD programs and non-DoD corporate efforts.

- Expect resistance.
- Risk, effort, and reward are inextricably linked.
- The government cannot retain control and transfer responsibility.
- There is a tendency to table the hard, large-payoff issues and end up with several smaller improvements.
- Line up your senior executive participation. You’re going to need it.
- One needs to stagger multiple, large changes.
- The change process is more difficult, pervasive, and time-consuming than originally envisioned.
- There is no “silver bullet.” Improvement will consist of many changes.
- Sometimes the best answer is doing things differently (major change).

Other times it is doing things better (incremental change).

- The effective use of integrated product teams is crucial. This includes:
 - participation of all stakeholders;
 - ensure top-notch personnel are assigned;
 - an aggressive but attainable schedule; and
 - stability of team members.
- Current (“As-Is”) costs are unknown and often impossible to determine.
- The *a priori* documentation of projected cost savings is difficult, and sometimes impossible.
- Cost-benefit analysis addresses effectiveness but not efficiency.
- If the ability to point out errors justifies continued oversight, it will never be reduced.
- Keep going back to look at the metrics. Are they the right ones?
- Documenting the “As-Is” model is essential. However, don’t use extensive analysis to stall the transition to implementation.
- The intra-government coordination and agreement is the hard part, i.e., the internal change process is more difficult than the external one.
- Planning is fun. Implementation is work.
- Executives frequently state strategies without knowing how they will be accomplished.
- You can’t accomplish major change in six months.
- The government often imposes requirements without considering their costs.
- Broad flexibility exists. Use it.
- The government as well as the contractor must be held accountable for progress.
- Challenge all requirements, practices, and assumptions.
- Major improvements are achievable.

This is not intended as a checklist. However, before undertaking a major change effort, leaders are cautioned to understand the difficulty of the course they about to embark upon. If you don’t have sufficient senior-level participation or the tenacity and endurance to see it through, it is much

better not to begin. A failed effort will not only be expensive and cause great disruption to the organization, but it will add to the ranks of the cynics who claim nothing can be done.

Summary

There are two major areas of commercialization: 1) the procurement of commercial hardware; and 2) the incorporation of more effective and efficient business processes. Both have the potential to provide significant improvement to a military program. The change process is lengthy, arduous, detailed, and time consuming. Consequently, the active participation by both the contractor’s and the government’s senior management is a prerequisite to success.

END NOTES

1. Historically, we have not done an exemplary job of determining the optimal trade-offs between current R&D expenditures and future logistics and operational cost avoidance. This is an enduring problem due to: 1) our personnel policies (rotating managers before results are known); and 2) our accounting system that does not provide a manager with sufficient cost avoidance data (in the Operations and Maintenance account) to argue for greater investment (in the procurement account); and 3) our management structure that has one organization responsible for the procurement of the system and another responsible for the support.
2. Even on a firm fixed price production contract, the contractor has little incentive to offer long-term cost savings. It generally involves an up-front investment and may take a year or two to result in cost savings. At that point, negotiations are underway for the subsequent lot, and the government disallows the cost.
3. The total Black Hawk production numbers include commercial and military foreign sales of the comparable S-70 aircraft. This production number does not include derivative aircraft such as the USN SH-60F Sea Hawk or USCG SH-60J.